

Claim 17

Line 2, please delete "horizontal plane" and substitute --plane of the flat material--.

REMARKS

Applicant expresses its appreciation to the Examiner for his time and comments regarding the above-referenced patent application in the interviews of April 20, 2000 and December 6, 2000. Prior to entry of the foregoing amendments, claims 1-3, 5-8, 10-12, and 14-21 are pending. Claims 6, 10 and 15 have been cancelled, and claims 7, 11, 12, and 16-17 are amended.

Objection to the Specification

The Examiner objects to the disclosure in paragraph 3 of the Office Action because the angle α is not clearly understood. The reference α is shown in amended FIGURE 1, thereby overcoming the objection.

Objections to the Drawings

The Examiner objects to the drawings in paragraph 4 of the Office Action because references "26" and 27" should be interchanged to maintain consistency. FIGURE 1 has been so amended. The Examiner has also objected the drawings in paragraph 6 of the Office Action to as failing to comply with 37 C.F.R. 1.84(p)(5) because they do not include the reference sign mentioned in the description. FIGURE 2 has been amended to show reference α , thereby overcoming the objection.

The Examiner also objects to the drawings in paragraph 6 of the Office Action under 37 C.F.R. 1.83(a) as not showing every feature of the invention specified in the claims. The "means for releasably coupling" must be shown or canceled from the claims. FIGURE 1 is amended to show the detachable drive unit 30, as noted in

paragraph 1(d) of the above-referenced Interview, and as described in the specification on page 6, line 25, thereby responding to the objection.

The foregoing amendments are understood to have been approved by the Examiner in the Final Office Action. See paragraph 2 of the Final Office Action.

To address the Examiner's concerns regarding confusion as to how the bush 13 is displaced, FIGURE 1 is also amended to show a circumaxial slot, in the cutter frame 51, for insertion of the pin wrench 25. As noted in paragraph 1 (a) of the Statement of the Interview of April 20, 2000, the Examiner agreed that the proposed change to FIGURE 1 is supported by the specification as filed. In particular, FIGURE 4 clearly shows the slot through which the pin wrench is inserted. As the Examiner requested, copies of all FIGURES are enclosed. For clarification, the Applicant notes that threads, which, as noted on page 7 of the specification, are between the rotating displacement bush 13 and the stationary slotted nut 23 for converting rotation of the bush 13 into an adjustment movement, are also shown in FIGURE 4. For example, see the horizontal, darker black line just below the slotted nut 23 in FIGURE 4.

The foregoing amendments to the drawings are submitted to address the Examiner's concerns and to avoid appeal on issues on which there is agreement. As requested by the Examiner in the Interview of April 20, 2000, a set of all six figures, including all figure changes, are resubmitted to ensure that the Figures are current. The Figures include the foregoing amendments approved by the Examiner during the Interview.

Claim Rejections Under Section 112

Claims 1-3, 5-8, 10-12, and 14-21 are rejected under § 112, paragraphs 1 and 2. Claims 1, 10 and 15 are canceled. Claims 7, 11 and 16 are amended so as to avoid dependence on a canceled claim.

Claims 12 and 17 are rejected because the Examiner contends that the phrase "horizontal plane" lacks clear antecedent basis. Claims 12 and 17 are amended to address the Examiner's concern, and to more clearly provide antecedent basis for "plane". Claims 12 and 17 now recite that "plane" refers to the "plane of the flat material."

Conclusion

Entry of the amendments is respectfully requested as the amendments narrow the issues for consideration on appeal, comply with requirements of form expressly set forth in the Final Office Action, and place the remaining rejected claims in better form for consideration upon appeal.

This Amendment After Final is submitted with an Appeal Brief, and petition is made in the Appeal Brief for an extension of time to submit the Appeal Brief. A check for the appropriate extension of time accompanies the Appeal Brief. No other fees are considered due. However, if it is determined that additional fees are due or that an overpayment has been made, please debit or credit, as appropriate, our Deposit Order Account 13-0235.

The Examiner is invited to contact the undersigned at the telephone number below to further resolve outstanding issues in the case.

Respectfully submitted,

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Claim 1

1. A circular cutter unit for cutting lengths of flat material comprising:

- upper and lower circular blades lying in planes substantially perpendicular to a plane defined by the flat material and parallel with a longitudinal direction of the flat material;
- upper and lower blade shafts respectively supporting said upper and lower circular blades, said shafts extending parallel with said plane of the material and perpendicular to said longitudinal direction;
- a non-positive drive connection between said circular blades including a transport ring mounted for rotation with the blade on one of the blade shafts and in driving relationship with the blade on the other of the blade shafts;
- a frame having substantially a U-shape when viewed in a direction perpendicular to the plane of the flat material with upper and lower legs interconnected by a flat yoke intersecting said plane of the flat material at an acute angle,
- means for rotatably supporting said upper and lower blade shafts respectively in said upper and lower legs;
- means for establishing and adjusting a cutting gap between said two circular blades; and
- means for releasably coupling one of the circular blades of said cutter unit to a driving unit having a motor.

Claim 2

A circular cutter unit according to claim 1 wherein said cutting gap is adjusted to between about 0.005 mm and about 0.030 mm.

Claim 3

A circular cutter unit according to claim 1 wherein said means for releasably coupling one of the circular blades is coupled to said lower circular blade.

Claim 5

A circular cutter unit according to claim 1 wherein the transport ring of said non-positive drive connection between said blade shafts is in frictional driving engagement with the other of the blades.

Claim 7

A circular cutter unit according to claim 1 wherein the means for rotatably supporting said upper blade shaft includes an axially displaceable bush mounted in said upper leg of said frame.

Claim 8

A circular cutter unit according to claim 1 wherein said cutting gap between said two circular blades is adjusted to a range of 0.01 to 0.020 mm.

Claim 11

A circular cutter unit according to claim 1 wherein each of said blade shafts has a diameter of less than 25 mm.

Claim 12

A circular cutter unit according to claim 11 wherein said acute angle at which said flat yoke intersects said plane of the flat material is in a range of 8 to 12°.

Claim 14

A circular cutter unit according to claim 1 wherein said circular blades have cutting edges overlapping radially by a distance in a range of 0.18 to 0.23 mm.

Claim 16

A circular cutter unit according to claim 14 wherein each of said blade shafts has a diameter of less than 20 mm.

Claim 17

A circular cutter unit according to claim 16 wherein said acute angle at which said flat yoke intersects said plane of the flat material is in a range of 9 to 11°.

Claim 18

An apparatus for cutting flat lengths of sheet metal in a generally horizontal plane comprising:

a plurality of circular cutting units each including:

upper and lower circular blades lying in planes substantially perpendicular to the horizontal plane and parallel with a longitudinal direction in which the sheet metal is fed between the circular blades,

upper and lower blade shafts respectively supporting said upper and lower circular blades, said shafts extending parallel with said horizontal plane and perpendicular to said longitudinal direction,

a frictional drive connection between said blade shafts including a transport ring mounted respectively on each one of the upper and lower blade shafts adjacent the upper and lower circular blades respectively, and disposed in frictional driving relationship with the circular blade on the other of the upper and lower blade shafts;

a frame having substantially a U-shape when viewed from above the horizontal plane with upper and lower legs interconnected by a flat yoke intersecting said horizontal plane at an acute angle, and

means for rotatably supporting said upper and lower blade shafts respectively in said upper and lower legs, and means for establishing and adjusting a cutting gap between said two circular blades; and

means for releasably coupling each said cutter unit to a driving unit having a motor,

a plurality of parallel guide rails extending perpendicular to said longitudinal direction; and

means on each of said frames slidably engaging said guide rails so that each of said circular cutter units is independently positionable along said rails.

Claim 19

An apparatus according to claim 18 wherein said means for establishing and adjusting said gap sets said gap to a width between 0.005 mm and 0.030 mm.

Claim 20

An apparatus according to claim 18 wherein said circular cutting units are mounted on said guide rails with said circular blades of each circular cutting unit oriented in parallel relationship with the circular blades of the other cutting units.

Claim 21

A cutter unit for cutting flat lengths of material comprising:

a supporting unit;

a driving unit having a motor;

a cutter head releasably connected to said supporting unit, said cutter head comprising;

first and second circular blades having cutting edges;

first and second blade shafts respectively supporting said first and second circular blades in positions to cooperatively cut the material and to maintain a cutting gap between said cutting edges;

a frame having first and second legs and a yoke interconnecting said legs;

means for rotatably supporting said first and second blade shafts
respectively in said first and second legs;

means for releasably connecting one of said two circular blades to said
motor of said driving unit; and

means for transmitting drive motion provided by said driving unit to
the other of said circular blades.